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METHOD FOR IMPROVING THE SETUP OF TELEPHONE-TO-TELEPHONE
CALLS

5 Field of the invention

Generally, the present invention relates to Internet telephony and intelligent networks (IN) function.

More specifically, the present invention relates to a
10 method for improving the setup of telephone-to-telephone calls using telephones connected to a PSTN/ISDN access network and using a separat network, especially Internet as a substantial by-pass network, special telephone gateways (GW) forming bridges between the access network
15 and said by-pass network, and connections being established between the user telephones (A,B) and the gateways (GW) that bridge the call.

20 Background of the invention

The application area of the present invention has been developed in connection with low tariff international telephone-to-telephone calls using the Internet as the main
25 carrier network, but the general aspect of the invention may also be related to any quality of service required.

Furthermore, the present invention is applicable not oly to international and long distance services but also to
30 any other geographically segmented services (e.g. local, regional, national).

Users have telephones connected to the PSTN/ISDN network. The Internet can be used to carry portions of the traditional PSTN/ISDN telephone-to-telephone calls. Special
35 Internet telephony gateways GW form bridges between the PSTN/ISDN access network and the Internet (which acts as the carrier network).

In a traditional telephone-to-telephone call, a connection between two parties is established at the call set-up phase. The originating party and the terminating party are identified by their respective telephone numbers

5 (caller A-num and callee B-num) during the set-up phase. Call logic is handled by the PSTN/ISDN network.

In a telephone-to-telephone call using the PSTN/ISDN network as the access network and the Internet as the main carrier network, connections must be established
10 between the user telephones and the gateways that bridge the call. The present invention presents a solution to the handling of call-establishment to the originating gateway. Extensions and enhancements to the basic invention are described later.

15

Prior art

Existing solution and problems with these

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Referring to Figure 1, there will now be given a description about how a traditional international call path is established.

The known solutions handle call establishment in two
25 phases. First, the caller (A) is required to set up a connection to a preferred originating gateway (Gwa). Second, the caller is required to dial the desired number that identifies the terminating telephone (B-num).

As an illustration, a typical, although simplified, call
30 handling sequence is as follows:

1. The caller (A) obtains a PSTN/ISDN connection to an originating gateway (Gwa) by dialing the gateway number.
2. Gwa sends a new dial tone or a voice message to A to
35 indicate that the connection has been established.

3. The caller (A) dials the number that identifies the
callee (B). (The gateway may extract the B-number from
the connection by interpreting Dual Tone Multiple
Frequency (DTMF) signals. Prior to this A may need to
5 enter a PIN number or similar for authorization
purposes).
4. GWa performs a number analysis on the B-number to
find the closest GW (Gwb) to B.
5. GWa establishes a data connection (connection
10 oriented or connectionless) to the terminating gateway
(Gwb) and transfers the B-number to Gwb using the data
network.
6. Gwb in turn establishes the final PSTN/ISDN
connection to the called party (B).
- 15 One advantage of the known solutions, in this context, is
that they make use of standard PSTN/ISDN functions.
However, the known solutions require the caller to handle
the call set up in two distinct phases which is
cumbersome. The caller is also required to know the
20 telephone number of the preferred (i.e., closest) gateway.
Indeed, the caller may need to keep a list of gateway
telephone numbers if the preferred one is busy, or if it
is down, or if other circumstances make it unavailable.

There are also other problems to the known solutions.

- 25 These are addressed in a later chapter which provides
extensions to the present invention described prior
thereto.

Objects of the present invention

- 30 An object of the present invention is to provide a method
for improving the setup of telephone-to-telephone calls in
relation to the prior art procedures.

Another object of the present invention is to provide a method by which the caller is allowed to handle the call set-up in one single phase, as in the case of traditional "local" telephone calls.

- 5 More specifically, an object of the present invention is to make the associated gateways transparent to the caller.

Still another object of the present invention is to utilize Internet telephony and intelligent networks (IN) functions in a far more efficient and less costly manner.

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Brief disclosure of the invention

- The above objects are achieved in a method as stated in the preamble, which according to the present invention is characterized in that for the purpose of making the gateways transparent to the caller (A) the method allows the caller (A) to dial a by-pass network service prefix together with the number of the callee (B).
- 15

- More specifically, it is according to the invention suggested that said by-pass network service prefix, i.e. an IN service prefix is adapted to identify the relevant IN service for thereby routing the call to an IN node which can execute this IN service.
- 20

- 25 In other words, the present invention allows the caller to handle the call set-up in one single phase, just as in case of conventional telephone calls, at the same time as the gateways appear transparent to said caller.

- 30 Further features and advantages of the present invention will appear from the following description taken in conjunction with the enclosed drawings, as well as from the appending patent claims.

35

Brief disclosure of the drawings

Fig. 1 is a sketch illustrating a traditional international call path.

Fig. 2 is a sketch illustrating an embodiment of the method according to the present invention.

10 Detailed description of embodiments

Fig. 1 illustrates a traditional international call path, which has been discussed previously, and wherein the set-up of telephone-to-telephone calls are made using
15 telephones connected to a PSTN/ISDN access network and using a separate network, here the Internet as a substantial by-pass network, special telephone gateways GWa and GWb forming bridges between the access network and said by-pass network, and connections being established between
20 a caller telephone A and a callee telephone B through appropriate gateways GWa and GWb.

An embodiment of the present method is illustrated in Fig. 2, wherein the handling of call establishment will
25 only take place in one phase.

More specifically, the present solution uses the Intelligent Network to:

- 30 1. Allow the user to establish a call in one single phase.

The user dials one number: IN service prefix + B-number. IN service prefix identifies the IN service: 'International calls over the Internet'. IN service prefix is used to route the call to the IN node which executes
35 this IN service.

2. Automatically find the closest/available gateway

The IN service 'International calls over the Internet' will find the closest GW by analysing the A-number. The service can also route to alternative Gws if the closest is busy, etc.

5 3. Establish call to the GW

The IN service will establish the call to GW, hereby named Gwa. In the call setup the Gwa number is included as destination number. In addition, the A and B-number is included.

10 A proposal/example on how this can be transferred on ISUP (IAM message)/DSS1 (SETUP message):

CallingPartyNumber: A-number
CalledPartyNumber: Gwa-number
RedirectingNumber: B-number

15 The information flow (see Figure 2) is as follows:

a = A dials: (IN service prefix + B-number) in one sequence

b = Call routed to IN:

20 CallingPartyNumber: A-number
 CalledPartyNumber: (IN service prefix + B-number)

c = Call routed to Gwa:

25 CallingPartyNumber: A-number
 CalledPartyNumber: Gwa-number
 RedirectingNumber: B-number

Restrictions

1. The invention couples gateway functionality with IN
30 which makes the gateway equipment dependent on IN functionality. The provider of such a service becomes dependent on an operator with the specific IN functionality.
2. Still address analysis in Gwa (see Extensions).

Advantages

- Call establishment in one step only.
- Since IN service logic is coupled to the GW application, value added functionality can easily be included (such as automatically finding the closest or available gateway).
- Number analysis can now be coupled with other services such as short numbers for a virtual network, and UPT.

Extensions and enhancements to the present invention

The problem area: Gwa still needs to analyse the B-number to find the GW closest to user B. Having these number analysis functions distributed implies that many Gws must be updated when changes in the network occur. This is a network management problem which the extension to the basic invention solves.

Existing solutions and problems with these: The Gws can perform complete number analysis functions with B-number as input and Gwb address as result. This analysis must then be in every GW and the network will be hard to maintain.

The invention: An extension to the basic invention can be made to solve the problem in such a way as to find the closest terminating gateway for any terminating B- number.

IN can be used to locate the terminating gateway. Suppose that A calls a B-number. In addition to finding the E.164 number to Gwa, IN can also find the IP-address to Gwb which is the gateway closest to the user B.

1. The IN maintains a list of the gateways, with their respective IP-address and the respective area code(s).

2. Based on the area code of the B-number the IP-address to the closest GW is found.
3. In the call setup towards Gwa the IP-address of Gwb is included.
- 5 4. Gwa uses the received Gwb IP-address in the remaining call handling process.

A proposal/example on how this can be transferred on ISUP (IAM message)/DSS1 (SETUP message):

10 CallingPartyNumber: A-number
 CalledPartyNumber: Gwa-number
 RedirectingNumber: B-number
 Subaddress: Gwb IP-address

The information flow (see Figure 2) is as follows:

15 a = A dials: (IN service prefix + B-number)
 in one sequence
 b = Call routed to IN:
 CallingPartyNumber: A-number
 CalledPartyNumber: (IN service prefix +
 B-number)
 20 c = Call routed to Gwa:
 CallingPartyNumber: A-number
 CalledPartyNumber: Gwa-number
 RedirectingNumber: B-number
 Subaddress: Gwb IP-address

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Broadening

30 The application has only addressed the Internet as the carrier or bypass network but the application can be broadened to, in general, address networks based on IP-technology and even to other packet based networks or technology, such as Frame Relay, ATM, hybrids of these, and so on.

Furthermore, the present invention is applicable not only to international and long distance services but also to

any other geographically segmented services (e.g. local, regional, national).

5 References

WO-SE00680: "Speech connection set-up method for interconnected networks registering network address of users who has a telephone and PC on network, with telephone system and uses address when making call connection".

10 **Comments:** The WO-SE00680 patent is related to this patent application in the sense that it too uses certain IN functions to solve certain addressing problems related to the domain of gateways. Note, however, that it addresses a
15 different problem within this domain. The following is a list to illustrate some of the differences:

- WO-SE00680 addresses an application area that have users connected to special PCs (PC connected telephones) - not plain old PSTN/ISDN telephones.
- 20 • WO-SE00680 uses IN primarily to locate called users using special PCs on a data network - not handle call set-up of telephone-to-telephone calls over the internet in one single phase.
- WO-SE00680 uses a register function to keep track of the
25 location of the users and the gateway that the respective users have registered with - this patent application does not use such an explicit register function.
- WO-SE00680 transfers the IP-address of a called user to the gateway that the user has a priori registered with -
30 In its basic form this application only transfers the B-number of the called user. In its extended form the B-number and the IP-address of the terminating gateway is transferred to the originating gateway for the purpose of addressing locating the nearest gateway.

02-02-2000
09/555592

PCT/NO98/00336

WO 99/29123

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527 Rec'd PCT/PTO 31 MAY 2000

P a t e n t c l a i m s

(Amended 02.02.2000)

1. Method for setting up telephone-to-telephone calls using telephones connected to a PSTN/ISDN access network and using a separate network, especially Internet as a substantial by-pass network, special telephone gateways (GW) forming bridges between the access network and said by-pass network, and connections being established between the user telephones (A,B) and the gateways (GW) that bridge the call,
- c h a r a c t e r i z e d i n that the calling party (A) in a one-step procedure dials a by-pass network service prefix together with the number of the called party (B), i.e. a prefix + B-number, and more specifically an IN service prefix,
- that said by-pass network service prefix is analysed to identify the relevant IN service for thereby routing the call to an IN node which can execute this IN service,
- the IN service establishes the call to an appropriate gateway (GW), which means that the gateway is made service transparent to the calling party (A).
2. Method as claimed in claim 1,
- c h a r a c t e r i z e d i n that said IN service is arranged to find the most appropriate, e.g. the closest gateway (GW) by analyzing the caller's number (A), and/or possibly route the call to an alternative gateway if the closest is busy, etc.
3. Method as claimed in claim 2,
- c h a r a c t e r i z e d i n that after the IN service has established the call (A) to the most appropriate gateway (GW), (GWa) there is in the call set-up included the associated gateway number (GWa) as destination number, as well as the caller number (A) and the callee number (B).

4. Method as claimed in claim 3,
characterized in that address analysis is
carried out in the gateway (Gwa) to which the call has been
routed.

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5. Method as claimed in claim 4,
characterized in that number analysis is
coupled with other services, for example short numbers for
virtual network, and UPT.

10

6. Method as claimed in any of the preceding claims,
characterized in that a process for finding
the most appropriate gateway for any terminating callee
number (B) is carried out in the intelligent network (IN),
i.e. by finding the E.164 number to an appropriate gateway
(Gwb), as well as the IP (Internet Protocol) address to the
gateway (Gwb).

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7. Method as claimed in claim 6,
characterized in that there is maintained an
updated list of gateways in the by-pass network, as well as
a list of respective IP-addresses and the respective area
code(s).

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8. Method as claimed in any of the preceding claims,
characterized in that the area code of the
number (B) of the callee is used to find the IP-address of
the most appropriate callee gateway (Gwb), for example the
closest gateway thereof.

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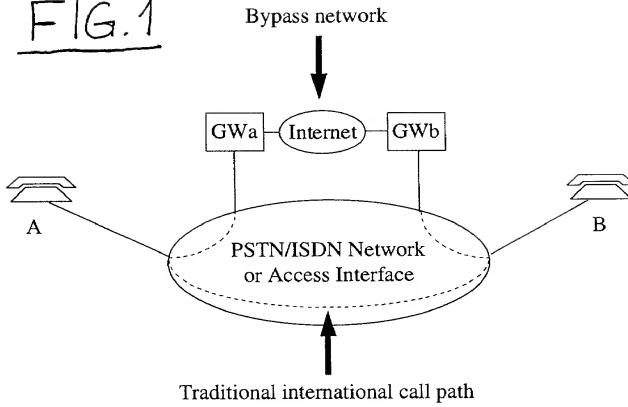
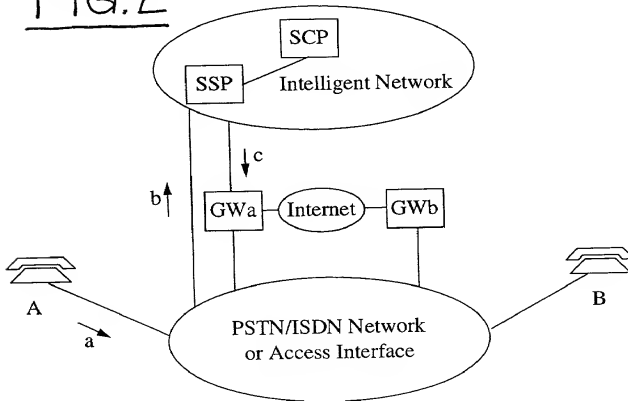
9. Method as claimed in any of the preceding claims,
characterized in that in the call setup from
the intelligent network (IN) towards the access gateway
(Gwa) the IP-address of the terminal gateway (Gwb) is in-
cluded, so that the access gateway (Gwa) can use the re-
ceived terminal gateway (Gwb) IP-address in the remaining
call handling process.

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10. Method as claimed in any of the preceding claims, characterized in that the most appropriate gateway (GWa) or gateways (GWa, GWb) is/are selected according to the quality of service (QoS) required, or possibly according to other criteria, for example tariff, availability, etc.

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FIG. 1FIG. 2

**RULES 63 AND 67 (37 C.F.R. 1.63 and 1.67)
DECLARATION AND POWER OF ATTORNEY**

FOR UTILITY/DESIGN/CIP/PCT NATIONAL APPLICATIONS

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; and

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **METHOD FOR IMPROVING THE SETUP OF TELEPHONE-TO-TELEPHONE CALLS**, the specification of which: (mark only one)

- (a) is attached hereto.
- X (b) was filed on MAY 31, 2000 (I.A. Filing Date: 11 November 1998) as Application Serial No. 09/555,592 and was amended on _____ (if applicable)
- (c) was filed as PCT International Application No. PCT/NO98/00336 on 11 NOVEMBER 1998 and was amended on _____ (if applicable).
- (d) was filed on _____ as Application Serial No. _____ and was issued a Notice of Allowance on _____.
- (e) was filed on May 31, 2000 and bearing attorney docket number 28170-00020

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above or as allowed as indicated above.

I acknowledge the duty to disclose all information known to me to be material to the patentability of this application as defined in 37 CFR § 1.56. If this is a continuation-in-part (CIP) application, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability of the application as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which my priority is claimed or, (2) if no priority is claimed, before the filing date of this application:

PRIOR FOREIGN PATENTS

Number	Country	Month/Day/Year Filed	Date first laid-open	Date patented or	Priority Claimed
			Published	Granted	Yes
19975518	NORWAY	DEC. 1, 1997			XX

I hereby claim the benefit under 35 U.S.C. § 120/365 of any United States application(s) listed below and PCT international applications listed above or below:

PRIOR U.S. OR PCT APPLICATIONS

Application No. (series code/serial no.)	Month/Day/Year Filed	Status(pending, abandoned, patented)
PCT/NO98/00336	NOV. 11, 1998	Pending

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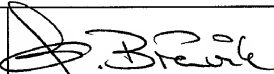
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